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THE WORKING-CLASS SHARE IN PRE-WAR CONSUMPTION

Until recently, it was not possible to use the 1937–8 sample of working-class budgets (collected by the Ministry of Labour) to estimate accurately the pre-war distribution of all working-class expenditure, because of the well-known under-representation of outlay on alcoholic drinks and tobacco. Now, however, the Ministry of Labour has published estimates for these items which are doubtless only approximate but which are certainly the best available.[1] We can show what outlay of the employed working-classes is implied by the budgets and this additional information.

The 'working-classes' refer to all wage-earners and to non-manual workers with salaries of less than £250 per annum, including dependants. We assume that the distribution of expenditure was the same for the average of 1938 as for the dates in 1937 and 1938 to which the budgets refer. The incomes of the employed working-classes so defined are estimated in Appendix A as £2,227 millions for 1938. Since the budgets cover outlay on most forms of saving and national insurance, we can assume that the whole of the £2,227 millions was laid out as shown by the budgets. Details of calculations are shown in Appendices. The results can be summarised as follows :[2]

	(£ millions)
Rent	265
Food	854
Clothing	202
Fuel and Light	144
Drink and Tobacco[3]	254
Other	508
Total ...	2,227

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[1] *Supplement No. 2 to the Industrial Relations Handbook* (H.M.S.O.), p. 6.

[2] This is of course only one way of estimating such consumption. It can also be estimated directly, commodity by commodity. Such estimates would not however add greatly to the accuracy since at various points arbitrary assumptions have to be made, while they would involve considerable labour—more than is justified by the order-of-magnitude conclusions given in this paper.

[3] Note that throughout the estimates of 'drink and tobacco' depend on estimates made by the Ministry of Labour in the Supplement cited, not on expenditure shown by the budgets.

These calculations assume that there was no bias in the sampling, whereas in fact only the more literate and more careful would keep budgets, and there is reason to expect a correlation between ability to keep budgets and care in arranging outlay. So that one would expect over-representation of necessities in the budgets, compared with all working-class expenditure. A further reason to expect bias is that those keeping budgets will be likely to forget expenditure away from home on goods not brought home, such as meals out, travel, entertainments, postal services, etc., which will also tend to cause over-representation of necessities. So that in all these calculations expenditure on rent and food may tend to be exaggerated, compared with expenditure on other items.

The 1937–8 budgets excluded the unemployed, but it seems that a more useful estimate would be of the total spending of the working-classes, including the unemployed and the retired. The total income of the whole working-class (including as before those normally receiving small salaries) is estimated in Appendix B at £2,600 millions for 1938. It is not likely that social security benefits will be spent in the same way as the income of the employed working-classes. Such incomes are not, however, large compared with working-class earnings, and they will tend to be spent relatively more on necessities than is the case for earnings. The bias towards necessities in the sample may therefore give more accurate results when taken as representing total working-class expenditure, than when used for analysing expenditure by the employed working-class only.

By arranging total working-class expenditure into the same groups of consumers' goods as is used by the National Income White Paper for estimating consumption by the whole British public, we can estimate what proportion of consumers' goods and services of different sorts was bought by the working-classes. This is done in Appendix B. The ratios shown there are of course only approximate. The White Paper estimates of consumption are subject to error, as is evidenced by the substantial revision made in successive issues of the White Paper for some of the estimates. Total working-class income and savings can also only be approximately estimated, and the division of working-class expenditure into groups is the result of a sample that is probably somewhat biassed. It seems worthwhile, nevertheless, to try to make estimates of the working-class share of consumption in a modern industrial society, even if such attempts cannot give us more, in our present state of knowledge, than broad orders of magnitude. They provide us with an idea how that part of the national product available for consumption was divided between social classes, with a tentative analysis by commodity group. They also provide us (by subtraction) with an estimate of the distribution of non-working-class expenditure, which will be used in a subsequent paper for constructing a middle-closs cost-of-living index. The share of the working-class in total consumption of various commodities in 1938 seems to have been roughly as follows :—

Commodity		*Approximate working-class share*
Food	Bread and Cereals	Over nine-tenths
	Meat	Seven-tenths
	Fish	Three-fifths
	Sugar, preserves, etc.	One-half
	Fruit	Three-fifths
	Potatoes and vegetables	Four-fifths
	Beverages	Five-sixths
	Manufactured foods	One-fifth
	All food	Just under three-quarters
Alcohol	Beer	Three-quarters
	Wines and spirits	One-sixth
	All alcohol	Just under three-fifths
Tobacco	Cigarettes	Two-thirds
	Other	Three-quarters
	All tobacco	Two-thirds
*Housing**		Three-fifths
Fuel and Light	Coal	Three-quarters
	Electricity	Two-thirds
	Gas	Four-fifths
	Coke, oil, wood	Three-quarters
	All fuel and light	Three-quarters
Household Durables†	Furniture	Just over two-fifths
	Hardware	Three-fifths
	All household durables	One-half
Household Non-Durables	Matches, soap, etc.	Three-quarters
Clothing and Footwear†	Footwear	Just under three-fifths
	Male clothing	Three-fifths
	Female and infant clothing	One-third
	All clothing	Just over two-fifths
	All clothing and footwear	Nearly one-half
Reading matter		Nearly one-half
Motoring and travel		One-quarter
Postal Services		Two-fifths
Entertainments		Two-thirds
Personal Services† ‡		Three-tenths
Luxury goods†		One-fifth
All consumers' goods and services		Slightly over one-half

* The Natural Income White Paper estimate of total expenditure on housing is based on Schedule A assessments and tends to understate total rental value, so that the working-class share is rather exaggerated throughout this paper, with middle-class rent payments correspondingly slightly under-estimated.

† Second-hand goods are not treated as consumption in the National Income White Paper (which includes only dealers' margins in 'Services'), but will have been included by those compiling household budgets. The working-class share of clothes, furniture, etc., will therefore be slightly inflated by the comparison, while its share of personal services will be shown as rather lower than it really is (on the White Paper definition of ' services '). There will also be a very slight under-estimation of all other goods due to the over-representation of clothes, etc., in the budgets. Gifts, which slightly increase working-class consumption, are excluded here.

‡Excludes medical service under N.H.I. which would increase the working-clas share.

For comparison with these proportions, it is estimated in Appendix A that the working-classes, as defined for this paper, formed 80 to 85 per cent of the whole population.[1] The remainder of the population, following the general if not precise usage, are considered ' middle-class ', *i.e.* those living on salaries above £250, proprietors of businesses and those living on investment income (other than retired members of the working-class) with their dependents. This is a very mixed collection, ranging from farmers struggling for a bare existence to millionaires, and the averages obtained below for ‘ middle-class ’ consumption clearly do not refer to any sizeable typical middle-class stratum. They are given for comparison with working-class consumption rather than to show typical middle-class spending.

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[1] This is not of course the same as the proportion who considered themselves working-class, which was very much smaller.

Appendix C compares working-class and middle-class consumption of each commodity group. In summary the distributions are as follows :—

Distribution of Working-class and Middle-class Expenditure in 1938 (*per £*)

	Working-class	*Middle-class*
Food	8/–	3/7
Rent	2/6	2/1
Fuel and Light	1/3	–/7[1]
Household goods	1/4	1/4
Clothing and Footwear ...	1/9	2/6
Other[2]	5/2	9/11
Total	20/–	20/–

Broadly speaking, the working-class spent just over one-third of its outlay on items other than food, rent, fuel, light and household goods, while the middle-class spent nearly two-thirds of its outlay on these other items.

The division of the national consumption would have been much more unequal but for the effect of direct taxes which took nearly one-fifth of middle-class income.[3] It seems from the estimate of working-class savings that the *personal* savings of the middle-class may not have covered death duties (as has been noted by other writers), the high standards of middle-class consumption pressing hard on middle-class incomes.[4]

Calculations are also made in Appendix C showing average expenditure by each class. This can be summarised as follows :—

Average weekly expenditure per head in 1938[5]

	Working-class	*Middle-class*
Food	9/1	17/6
Alcohol	1/7	6/3
Tobacco	1/1	3/–
Rent and Rates	2/10	10/1
Fuel and Light	1/5	2/8
Household goods	1/6	6/8
Clothing and Footwear ...	2/–	12/4
Motoring and Travel	–/8	11/3
Services	1/11	19/3
Other goods	–/8	8/10
Total	£1/2/7	£4/17/9

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[1] The estimates of middle-class consumption of fuel and light depend on the correction for over-representation of this group in the budgets, and they are therefore subject to a particularly wide margin of error.

[2] Of this nearly half was Drink and Tobacco in the case of the working-classes, but under one-fifth in the case of the middle-classes, showing a striking contrast in non-essential spending.

[3] Pre-tax total incomes of the working- and middle-classes were almost equal.

[4] At least for 1938. This must represent a considerable change from middle-class habits a century previously (though 1938 saw a minor depression and may not have been a good year for middle-class saving).

[5] Using the estimate in Appendix A that the working-classes formed 84 per cent of the pre-war population.

These averages conceal very wide divergences within each class. They are also subject to the bias mentioned above, so that the middle-class outlay on luxuries will tend to be exaggerated, and on necessities to be under-estimated.

With these qualifications in mind we can make the following comparisons for different commodities :

Middle-class consumption per head as a multiple of working-class:

Less than twice—
- Potatoes and Vegetables
- Beer
- Tobacco (other than Cigarettes)
- Coal
- Gas
- Household non-durables

Two to three times—
- Meat and bacon
- Fish
- Cigarettes
- Electricity
- Hardware
- Entertainments

Three to four times—
- Fruit
- Housing
- Footwear
- Male clothing

Four to seven times—
- Sugar products
- Furniture
- Reading matter

Seven to ten times—
- Female and infant clothing
- Postal services

Ten to fourteen times—
- Personal services

Fourteen to twenty times—
- Travel
- Luxury goods

Twenty to thirty times—
- Wines and spirits

(Ranges are given because of the difficulty of estimating populations, and the possibility of bias.)

For all food, it is estimated that middle-class consumption per head was one-and-a-half times to twice working-class. For consumers' goods and services of all kinds, it was three-and-a-half to four-and-a-half times working-class.

The general comparison does not depend on the strict validity of all the assumptions made. It may be inaccurate in one or two particulars, but it would be a formidable statistical task to change the overall picture shown by it.[1] Moreover, such changes as are made would involve changes in the opposite direction elsewhere. Considerable adjustments cannot be made in total working-class expenditure, since it depends mainly on wages and the direct taxes on the working-class, which are not subject to great errors ; and the estimates of population would not seem to be subject to great error. Whatever adjustments were made, average middle-class consumption would be found to be several times average working-class consumption in most lines. An attempt is also made in Appendix C to show the differences between types of middle-class expenditure by illustrative figures of possible ' lower ' and ' upper ' middle-class spending.

It seems that the ' lower ' middle-class may have had only about double working-class consumption per head on most commodities, while ' upper ' middle-class spending may have been as a whole some ten times working-class, and a very much higher multiple in the case of luxuries. The possibilities of raising working-class consumption or of increasing capital investment by restricting middle-class consumption (in addition to the scope given by the elimination of unemployment) seem, in 1938, to have been considerable, as subsequent events have shown.

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[1] All assumptions have been set out so that anyone who wishes to do so may repeat the procedure.

DUDLEY SEERS.

APPENDIX A

INCOMES AND POPULATION

For salaries under £250, the frequency distribution of salaries shown by the samples taken in 1938 and given in an essay by Joan G. Marley and H. Campion[1] were used. From these samples we can make the following estimates about salaries :—

	No. under £250 p.a. *(thousands)*	*Income* *(£ millions)*
Industry	1,630	224
Teaching	90	19
Civil Service	185	33
Distribution	1,015	116
Total	2,920	392

For investment incomes in 1937, we have from Barna[2] an estimate of £149 millions for those with total incomes of less than £250 per annum. We shall take this as applicable to 1938 also, since investment income is fairly stable. We shall also assume that the investment income of those not in the working class but with total incomes below this level exceeded the investment income of those members of the working-class with incomes above this level, and that the investment income of the working-class proper (as defined in this paper) was £125 millions. It is further assumed that 70 per cent of this went to the employed working-class, 30 per cent to the unemployed and retired.

Transfer incomes for 1938, taken from the National Income White Paper[3], were as follows :—

		£ millions
Central Government	Non-contributory (old age and supplementary) pensions ...	47
	Unemployment Allowances	35
	War Pensions	38
	Miscellaneous transfers	3
National Insurance	Contributory pensions	47
	Sickness Benefits	22
	Unemployment Benefits	55
Local Authorities	Outdoor relief	23
	Total	270

Of these it is assumed that £6 millions went to the middle-classes (mainly officers' war pensions) and 5 per cent. to the employed working-classes (since the bulk of the transfers go to the aged and unemployed working-classes).

Imputed incomes (mainly increases in institutional funds) that can be ascribed to the working-classes are estimated at £45 millions,[4] and total net working-class savings, including increases in institutional funds, at £172 millions.[5]

On these assumptions we have the following estimates of working-class income and expenditure in 1938 :–

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[1] ' Changes in Salaries in Great Britain, 1924–1939 ', from *Studies in the National Income* (ed. Bowley), p. 84 *et seq*.

[2] *Redistribution of Incomes through Public Finance in* 1937, p. 270.

[3] *Cmd.* 7371.

[4] Barna. *op.cit.*, p. 73. Imputed incomes in 1937 of these with total incomes under £250 p.a.

[5] Barna, *op. cit.*, p. 60, estimates working-class institutional savings, following Suthers and Radice, at £154 millions in 1938. From this must be deducted cost of industrial insurance, treated as consumption expenditure in this paper (£27 millions). To this £45 millions is added for cash hoarding, savings in local clubs, savings out of imputed income other than through institutions already included, etc. (See however p. 191.)

		£ millions
Wages		1,735[1]
Working-class salaries		392
Investment income of employed working-classes		87
Transfer incomes of employed working-classes		13
Total visible incomes of employed working-classes		2,227
Income of working-class servicemen		39[2]
Investment income of other working-classes		38
Transfer incomes of other working-classes		251
Imputed incomes of working-classes		45
Total working-class income		2,600
Less Working-class tax payments	67[3]	
Working-class savings	172	
Income in kind of working-class servicemen	14[4]	
		253
Working-class expenditure		2,347

(Note that the estimated division of working-class investment and transfer incomes between ' employed ' and ' other ' working-classes does not affect the estimate of working-class expenditure.)

While some of the estimates are obviously subject to a wide margin of error, the final estimate depends mainly on the National Income White Paper estimate of Wages, which is fairly reliable, and errors in the totals may not be a considerable proportion of these totals.

For population we use the estimates of Colin Clark, taken from census and unemployment insurance data, that there were 12,627 thousand male employees earning wages or low salaries in 1931 out of a total male occupied population of 15,001 thousand,[5] or 84.2 per cent. If we deduct those aged 14, 15 and over 65 we have 11,690 thousand out of 13,914 thousand, or 84.0 per cent,[6] which is the percentage of occupied males aged 16–64 in the ' working-classes ' as the term is used in this paper. Of the few hundred thousand ' unoccupied males', a majority, though of unknown magnitude, would have been 'middle-class' (since students and 'drones' formed the bulk of this category, although some unemployed men in the working-class would have described themselves as 'unoccupied'), which means that of all males aged 16–64, the working-classes formed slightly less than 84 per cent in April 1931.

There was some tendency for salaries to be higher in 1938 than in 1931, which might carry a number over £250.[7] In addition there is a tendency for the middle-classes so defined to grow—the total of proprietors and managers in retail trade and commerce increasing by nearly a quarter of a million between 1921 and 1931. This would indicate taking a lower figure for the working-classes as a percentage of total population in 1938. For the division of consumption, we are concerned, however, with the total working-class population, including dependants. In the cases of some retired people, living by themselves on investment income, and some young people temporarily on low salaries, it might be difficult to say whether they were ' working-class ' or not, but the pattern of British society was (and is) sufficiently clearly defined to enable the great majority of people to be definitely placed, in general according to the work and income of the head of the family, and a division of the whole population into ' working-class ' and ' middle-class ' is therefore not meaningless. There may be some tendency for dependants per occupied male to be higher for the working-class because of larger families, which would tend to make the proportion of working-classes in the whole population higher than that shown above. On balance, therefore, the figure of 84 per cent may not be very inaccurate. The remainder of the data, and the approximate conclusions which are reached, do not warrant very elaborate calculations to reach a slightly more precise estimate.

[1] *Cmd.* 7371, Table 10. Tips almost wholly escape the National Income estimator and working-class income and expenditure will be short to that extent. (On the other hand, evasion may well be higher among the self-employed middle-classes causing an understatement of profits in the White Paper).

[2] Half the income of servicemen shown in *Cmd.* 7371, Table 10.

[3] *Cmd.* 7371, Table 24. £10 millions allowed for income tax on low salaries and investment incomes.

[4] *Cmd.* 7371, Table 20 shows total income in kind of servicemen as £17 millions. Income in kind of ' other ranks ' is a higher proportion of all service income in kind than total income of ' other ranks ' is of total service income.

[5] *National Income and Outlay*, pp. 29–30.

[6] Assuming that 10 per cent of independent workers, 4 per cent of employers and high salary-earners are outside the 16–64 range.

[7] Marley and Campion, *op. cit.*, p. 92. Index numbers of salaries.

The total population of the United Kingdom in mid-1938 was 47.5 millions.[1] The working-classes as defined above were therefore approximately 39.9 millions, and the middle-classes 7.6 millions. Some check is available on this from the fact that the 1937–38 household budgets showed (after adjusting as above) an outlay of 1056 pence per week by the average employed working-class household of 3.77 persons, or 280 pence per person. £2,227 was spent in this way, which implies a population in employed working-class households of 36.7 millions (which would include some of the retired and unemployed, but not all of them). Barna estimated that 40.55 millions belonged to the families of producers with incomes under £250 per annum in 1937.[2]

In view, however, of the possible margin of error involved in the population estimate, it will be assumed for purposes of drawing conclusions that the working-classes were 80–85 per cent, the middle-classes 15–20 per cent of the population, which provides estimates of the size of the working-class as 38.0 to 40.4 millions, and the middle-class as 7.1 to 9.5 millions.

APPENDIX B

WORKING-CLASS CONSUMPTION IN 1938

The income of the employed working-classes in 1938 is estimated in Appendix A as £2,227 millions. It is assumed that this was all disposed of according to the average pattern shown by working-class budgets collected by the Ministry of Labour in 1937 and 1938.[3] These budgets covered indirect tax payments and institutional savings as well as expenditure on consumption. They formed a large sample. The Ministry selected about 30,000 names at random from registers of insured workers and lists of uninsured workers, and visitors found 22,000 suitable for the enquiry. Of these 10,396, or slightly under half, provided budgets which were satisfactory for all four weeks.[4] While the selection of names was doubtless adequately randomised, there remains the bias due to the fact that less than half of those selected could provide satisfactory budgets.

For clothing, the special twelve-month budgets collected by the Ministry were used,[5] and estimates of expenditure on alcohol and tobacco were taken from the Ministry of Labour's account of the Interim Index of Retail Prices,[6] since the budget figures for these items are unsatisfactory. The budget estimates of fuel and light expenditure seemed high. They gave an average of 1s. 8d. per head per week, as against 1s. 7d. per head for the whole population from the National Income White Paper. This may be because the months chosen (October, January, April and July) had rather higher conusmption than usual. Since, in addition, the fact that fuel and light expenditure would only rarely be overlooked might cause it to be over-represented when treating the budget as an unbiassed sample, the fuel and light items were reduced by 10 per cent. Adjustments which also had to be made to the average expenditures shown by the budgets, before using them to divide this £2,227 millions, were to insurance premia and trade union subscriptions. These had to be reduced to allow for claims and benefits which did not affect particular members of the working classes but which do affect the working-classes as a whole. Part of these outlays are merely transferred to others, to be treated in most cases as supplementary income.[7] After deducting this part we are left with saving and the costs of administration. The proportions of net saving and administration costs in insurance premia, presumed wholly industrial insurance, were calculated from the summarised report of the Industrial Assurance Commissioner,[8] and the proportions for trade union subscriptions from estimates of Halpern.[9]

The total estimated expenditure by the whole employed working-class on each item, calculated in this way, is shown in Table I.

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[1] *Annual Abstract of Statistics*, No. 84, p. 7.

[2] *op. cit.* p. 66. This will however include a number of supplementary earners (*e.g.* daughters), belonging really to ' middle class ' families.

[3] The estimation of this average pattern was fully described in a paper entitled 'The Increase in the Working-Class Cost-of-Living since before the War ', printed in last month's BULLETIN.

[4] The procedure is fully described in the December 1940 *Ministry of Labour Gazette*, pp. 300–1.

[5] Summarised in the *M.O.L. Gazette* for December 1940 and January 1941.

[6] *Supplement No. 2 to the Industrial Relations Handbook.*

[7] While any one payment by insurance companies will not immediately be spent, total payments will approximately equal total spending from past payments. Some of this spending may be by those no longer in the employed working-class, but it would be very difficult to allow for this.

[8] *Annual Abstract of Statistics*, No. 84, p. 245.

[9] BULLETIN, Vol. 5, p. 237.

TABLE I[1]

Outlay by the Employed Working-Class in 1938
(£ millions)

I.	*Rent*				265
II.	*Food*				
	Bread	68	Lard	8	
	Flour	22	Suet, dripping, etc.	6	
	Cakes, buns, etc.	30	Cheese	18	
	Biscuits	8	Eggs	46	
	Oatmeal and cereals	5	Tea	42	
	Rice, sago, etc.	3	Cocoa	3	
	Beef and veal	68	Coffee	2	
	Mutton and lamb	36	Sugar	27	
	Pork	14	Preserves	13	
	Canned, potted meat	5	Syrup, treacle, etc.	2	
	Sausages, meat pies	16	Potatoes	27	
	Other meat	11	Green vegetables	15	
	Rabbits, poultry	5	Dried legumes	2	
	Bacon, ham	48	Root vegetables	11	
	Fish, fresh	15	Onions, etc.	3	
	dried	4	Canned and bottled veg.	3	
	canned, paste	7	Apples	9	
	fried and chips	9	Oranges	9	
	Milk, fresh whole	76	Bananas	6	
	skimmed	1	Other fresh fruit and nuts	7	
	condensed	7	Dried fruit	9	
	dried	3	Canned and bottled fruit	6	
	Cream	2	Meals out	28	
	Butter	62	Other food	20	
	Margarine	10			
			Total Food		854
III.	*Clothing*				
	Men's	58	Clothing repairs	4	
	Women's	64	Footwear	38	
	Children's	25	Footwear repairs	14	
			Total Clothing		202
	Fuel and Light				
IV.	Coal	72	Electricity	21	
	Coke	2	Oil, firewood, etc.	18	
	Gas	32			
			Total Fuel and Light		144
V.	*Miscellaneous*				
	Soap	19	Education	8	
	Soda, polish, etc.	9	Hairdressing	13	
	Ironmongery	5	Laundry	13	
	Brushes, brooms	2	Medical services	22	
	Pottery, glass	3	Toilet goods	12	
	Drapery	14	Hospital funds	7	
	Furniture	27	National insurance	52[2]	
	Floor coverings	14	Commercial insurance	28[3]	
	Other household utensils	8	T.U. subscriptions	23[4]	
	Cigarettes	84	Licences	13	
	Other tobacco	23	Domestic service	5	
	Rail fares to work	15	Holidays	16	
	Bus, tram fares to work	22	Food for pets	4	
	Other fares	18	Beer	134	
	Papers and magazines	25	Other alcohol	13	
	Books, stationery	5	Other spending	63	
	Postal services	10			
	Cinemas	22	*Total Miscellaneous*		762
	Other entertainments	12			
			GRAND TOTAL		2227

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[1] For full description of items, see *M.O.L. Gazette*, December, 1940, pp. 304–5. The large size of the sample means that random errors due to sampling fluctuating will be very low. The standard error of estimating a commodity on which £100 millions was spent is only

[continued overleaf

Table I gives the expenditure according to the groups taken from the household budgets directly. It will, however, be more useful for the purposes of this paper to group expenditure according to the National Income White Paper groups. This will provide estimates which will be less accurate but will be comparable with those of the whole public's expenditure in the National Income White Paper.

The whole working-class, including unemployed and those past working age, spent £2,347 millions in 1938, according to the estimate in Appendix A.[5] Assuming that this is spent according to the proportions shown by the sample, and grouping expenditure into the same categories as are used by the National Income White Paper, we can compare working-class consumption with total consumption as is done in Table II. For grouping, the same assumptions have been made as for 'The Increase in the Working-Class Cost-of-Living since before the War'.[6] Some items excluded for the weighting system in that paper (following the procedure of the Technical Committee on the Cost-of-Living Index), such as education and medical services, are here included. Insurance premia and T.U. subscriptions are here further reduced to exclude the proportion attributable to increases in funds (which are included in institutional saving), using the sources of information given above, the weekly cost of insurance services being estimated by these means at 10½d.[7] and T.U. services at 7d.[8]

While most of the items do not look unreasonable, the cases of 'oils and fats' and 'dairy products' seem very strange. There is of course a substantial margin of error in the estimates of working-class expenditure, as will be evident from the details of procedure, and this might account for the estimate of working-class consumption of 'dairy products' exceeding the White Paper estimate of total national consumption, especially since we might expect some exaggeration of food expenditure. But the excess in the case of 'oils and fats' seems too great to be due to such errors.

Strangely enough, in the case of both these items, the latest National Income White Paper makes estimates very considerably below those of the previous National Income White Paper,[9] which estimated 1938 consumption of 'oil and fats' at £98 millions and of dairy products at £204 millions.[10] The latest estimates are lower by as much as one-fifth. It seems quite likely, therefore, that the error is in the National Income White Paper estimates in column (2), as well as in my estimates in column (3). The peculiarity of the latest official estimate for 'oils and fats' is shown by the fact that it implies a national average consumption per head (using the population estimate of 47.5 millions for mid-1938) of 7.6d. per week, while the Ministry of Labour's 1937–8 Budgets showed an average *working class* expenditure of 7.8d. for *butter alone*, and 10.8d. for all fats. So the apparent paradox does not necessarily throw doubt on the reliability of these calculations.

£0.45 millions, or less than the error which may be caused by rounding. Errors caused by the approximations to drink and tobacco expenditure, and by bias will be larger.

[2] Cf. the estimate of £55 millions in *Cmd. 7371*, Table 16. There may have been some omissions in the budgets because these are generally deducted at source. The official estimates also include some voluntary non-working-class contributions.

[3] Total gross premia come to £58 millions, which is the same as the total premia paid for industrial assurance (*Annual Abstract* No. 84, p. 245), though the latter includes some premia paid by those not in the employed working-class, and the former will include some annuity and ordinary insurance premia.

[4] Probably includes some friendly society premia.

[5] This excludes direct taxes and savings, most of which are included in the 'outlay' shown by Table I.

[6] BULLETIN, Vol. 10, No. 5. In addition it was assumed that the 2d. for pets' food could be divided as 1d. to cereals, and 1d. to meat; 9½d. for 'other food' as 3d. confectionery and jellies (in 'sugar and preserves'), 3d. pickles and sauces (in 'potatoes and vegetables'), and 3½d. canned soup, welfare foods, etc. (in 'miscellaneous manufactured goods'), all these items probably nevertheless being rather inadequate; that 1½d. out of the miscellaneous fuel and light was for candles (in 'other household goods'); that of all 'miscellaneous expenditure' considered to be for 'appliances', 2d. referred to radios and gramophones (in 'furniture'), 2d. to sports goods (in 'other goods'); that of 2½d. on 'books and stationery', 2d. referred to 'stationery' (in 'other goods'), and that 5d. out of all 'miscellaneous expenditure' referred to 'other goods'. Of 'meals out' (13d.) and 'holiday spending' (7½d.) it was assumed that 10d. covered original food cost, the remainder being in effect spread proportionately over all other spending by being omitted. Licences other than radio and motoring are assumed to account for 1½d.

[7] Nearly 40 per cent of the premium, as is usual for industrial assurance.

[8] About 45 per cent of subscriptions.

[9] *Cmd. 7099*, p. 42.

[10] The difference cannot be due to a change of definition. The *Cmd. 7099* describes 'oils and fats' as 'Butter, margarine, lard and edible vegetable oils', while *Cmd. 7371* defines them as 'Butter, margarine, lard and other edible fats', which would seem if anything to be a slightly broader definition. The definition of 'dairy products' also appears to be unchanged.

Table II

Estimates of National and Working-Class Consumption in 1938[1]
(£ millions)

(1) *National Income White Paper Group*	(2) *Total National Expenditure*	(3) *Working-class Expenditure*	(4) (3) *as percentage of* (2)
1. *Food*			
(*a*) Household			
i Bread and Cereals	162	152	94
ii Meat and Bacon	325	227	70
iii Fish	53	33	63
iv Oils and fats	78	94	(121)
v Sugar, preserves	111	53	48
vi Dairy products	164	168	(102)
vii Fruit	85	49	58
viii Potatoes and Vegetables	99	78	79
ix Beverages	68	56	83
x Other manufactured foods	38	8	21
Total Household	1,183	919	78
(*b*) Other	104	23	22
Total Food	1,287	942	73
2. *Alcohol*			
(*a*) Beer	195	148	76
(*b*) Other	90	14	15
3. *Tobacco*			
(*a*) Cigarettes	144	92	64
(*b*) Other	33	25	76
4. *Rent and Rates*	491	292	59
5. *Fuel and Light*			
(*a*) Coal	108	79	73
(*b*) Electricity	35	22	63
(*c*) Gas	38	31	82
(*d*) Other	16	12	75
6. *Household durables*			
(*a*) Furniture, furnishings	152	65	43
(*b*) Hardware	82	51	62
7. *Matches, Soap, etc.*	54	41	75
8. *Clothing, footwear*			
(*a*) Footwear	73	42	57
(*b*) Clothing			
i. Men's and boys' wear	127	74	58
ii. Women's, girls' and infants' wear	246	87	35
9. *Reading matter*	64	29	45
10 & 11. *Motoring and Travel*	290	67	23
12. *Postal Services*	29	11	39
13. *Entertainments*	64	41	65
14. *Other services*	483	143	30
15. *Other goods*	177	38	22
Total	4,278	2,347	55
16. *Income in kind of H.M. Forces*	17	14	82
Grand Total	4,295	2,361	55

It will be clear from Appendix A that the estimate of working-class savings is the weakest statistical link. Fortunately, however, savings are in any event small compared to expenditure, and an error of £50 millions (or 30 %) in the estimate of savings would only cause an error of 1 in the estimate of the percentage of total consumption going to the working-class, and therefore an average error of 1 in column (4).

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[1] For a full description of the coverage of the White Paper groups, see *Cmd. 7371*, pp. 44–6. The percentages given in the last column are not accurate to the unit digit, and are given only to indicate the approximate size of the proportion.

APPENDIX C

A Comparison of Working-Class and Middle-Class Consumption

From Table II, we can obtain the information in Table III, which shows the estimates of middle-class consumption for broad groups of items, found by subtraction. The right-hand side of the Table shows the percentage of each class's total expenditure which was spent on each commodity group.

Table III

Total Working-Class and Middle-class Consumption in 1938
(£ millions)

	Working-class Expenditure	*Middle-class Expenditure*	*Percentage of total working-class expenditure*	*Percentage of total middle-class expenditure*
1. Food	942	345	40	18
2. (*a*) Beer	148	47	6	2
(*b*) Other alcohol	14	76	1	4
Total Alcohol	162	123	7	6
3. (*a*) Cigarettes	92	52	4	3
(*b*) Other tobacco	25	8	1	*
Total Tobacco	117	60	5	3
4. Rent and rates	292	199	12	10
5. (*a*) Coal	79	29	3	2
(*b*) Electricity	22	13	1	1
(*c*) Gas	31	7	1	*
(*d*) Other	12	4	1	*
Total Fuel and Light ...	144	53	6	3
6. (*a*) Furniture, furnishings ...	65	87	3	4
(*b*) Hardware	51	31	2	2
Total Household Durables	116	118	5	6
7. Household non-durables ...	41	13	2	1
8. (*a*) Footwear	42	31	2	2
(*b*) (i) Male clothing	74	53	3	3
(ii) Female and infants' clothing	87	159	4	8
Total clothing	161	212	7	11
Total Footwear and Clothing	203	243	9	13
9. Reading matter	29	35	1	2
10 & 11. Motoring and Travel ...	67	223	3	12
12. Postal Services	11	18	*	1
13. Entertainments	41	23	2	1
14. Other services	143	340	6	18
15. Other goods	38	139	2	7
Total	2347	1931	100	100
16. Income in kind of H.M. Forces	14	3		
Grand Total	2361	1934		

*Less than 0.5

Using the estimates for the working-classes in Appendix A, and for the whole population in the National Income White Paper, we have by deduction estimates of taxation and saving out of each type of income as in Table IV.

If we use the population estimates in Appendix A, we can also show the average consumption per head of each commodity, for both the working-class and the middle-class, as is done in Table IV, which shows a range for each commodity, because of the ranges given for possible estimates of the size of the two classes. The range is primarily designed to cover error in population estimating, but it is sufficiently large to take care of much of the error due to bias also.

In order to illustrate the differences between different sections of the middle-class, we shall divide it into the 'lower' middle-class with incomes below £500, and the 'upper' middle-class with incomes above that level. Colin Clark estimated that in 1929 there were 1,016 thousand self-employed with incomes below £250, and in 1932, 1,029 thousand. Their incomes were estimated at £134 millions and £133 millions respectively.[1] Let us assume 1 million, with an income of £140 millions, post-tax and post-saving, in 1938. In addition there were 2 millions in the £250–£500 group, who had £662 millions post-tax.[2] But this included many wage-earners.[3] Let us assume that there were 1½ million ' middle-classes ' in this group, who had £500 millions left after saving. Let us also assume that the first group spent their income according to the pattern shown by the working-class budgets; that the second group spent theirs according to the budgets shown in Mr. Massey's Paper

Table IV[4]

Average consumption per head by working-class and middle-class in 1938

(£ per annum)

	Working-class	*Middle-class*
1. Food	23—25[5]	36—49[6]
2. (*a*) Beer	4	5—7
(*b*) Other alcohol	*	8—11
3. (*a*) Cigarettes	2	5—7
(*b*) Other tobacco	1	1
4. Rent and Rates	7—8	21—28
5. (*a*) Coal	2	3—4
(*b*) Electricity	1	1—2
(*c*) Gas	1	1
(*d*) Other	*	*
6. (*a*) Furniture, furnishings	2	9—12
(*b*) Hardware	1	3—4
7. Household non-durables	1	1—2
8. (*a*) Footwear	1	3—4
(*b*) (i) Male clothing	2	6—7
(ii) Female and Infants' clothing	2	17—22
9. Reading matter	1	4—5
10 & 11. Motoring and Travel	2	23—31
12. Postal Services	*	2
13. Entertainments	1	2—3
14. Other services	4	36—48
15. Other goods	1	15—20
Total[7]	58—62	204—272

* Less than 0.5

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[1] *National Income and Outlay*, p. 106.

[2] *Cmd*. 7371, p. 9. This excludes imputed incomes.

[3] And also some with low salaries but investment incomes. 'Incomes; are there total' incomes.

[4] Totals do not always add, because of rounding.

[5] Of this £4 refers to bread and cereals, £6 to meat and bacon, £2 to oils and fats, £1 to fish, £2 to dairy products, £1 to sugar products, £1 to fruit, £2 to potatoes and vegetables, £1 to beverages, other items not being firm enough to quote.

[6] Of this £10—14 refers to meat and bacon, £2—3 to fish, £6—8 to sugar products, £4—5 to fruit, £2—3 to potatoes and vegetables, £1—2 to beverages, other items not being firm enough to quote.

[7] Includes income in kind of H.M. Forces.

for salary-earners in the £250–£500 range (making analogous assumptions for grouping, etc., to these made for the working-class budgets);[1] and that the 'lower' middle-class contained 5.7 of the 7.6 millions in the middle-class.[2] On these assumptions per capita consumption was as shown in Table V. It should be emphasised that these estimates are merely the, results of the assumptions made, and are cited for illustrative purposes, rather than to indicate actual magnitudes. The estimates of the consumption of the top 1.9 millions, in particular, are residuals from a series of estimates.[3] The lack of information on the expenditure of the rich is a major gap in our social statistics.

TABLE V

A tentative division of middle-class consumption in 1938

	Total (£ millions)		*Per capita* (£)		*Percentages*	
	Lower middle class	*Upper middle class†*	*Lower middle class*	*Upper middle class†*	*Lower middle class*	*Upper middle class†*
1. Food	224	121	39	64	28	11
2. (*a*) Beer	38	9	7	5	5	1
(*b*) Wines and Spirits ...	14	62	2	33	2	5
3. (*a*) Cigarettes	24	28	4	15	3	2
(*b*) Other tobacco	5	3	1	2	1	*
4. Rent and Rates	103	96	18	51	13	8
5. Fuel and Light	43	10	8	5	5	1
6. (*a*) Furniture	47	40	8	21	6	4
(*b*) Hardware	13	18	2	9	2	2
7. Household consumables ...	10	3	2	2	1	*
8. (*a*) Footwear	11	20	2	11	1	2
(*b*) (i) Male clothing ...	23	30	4	16	3	3
(ii) Female and infants' clothing	35	124	6	65	4	11
9. Reading matter	9	26	2	14	1	2
10 & 11. Travel and motoring	47	176	8	93	6	16
12. Postal services	8	10	1	5	1	1
13. Entertainments	13	10	2	5	2	1
14. Other services	103	237	18	125	13	21
15. Other goods	28	111	4	58	4	10
Total	800	1131	140	595	100	100

* Less than 0.5. † Those with incomes above £500 per annum.

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[1] *J.R.S.S.*, Vol. CV, p. 159. For most commodities the consumption of the £250—£350 group was slightly above the national average. It was assumed that this group consumed 10 per cent more alcohol and tobacco anth the national average and that under-declaration was a similar ratio of consumption for the £350—£500 group.

[2] On the above assumptions it received 71 per cent of the incomes, but would have contained a rather greater percentage of the middle-class population.

[3] The smallness of upper middle-class consumption of fuel and light indicates that possibly more than 10 per cent should have been deducted from working-class consumption.

THE FALL IN CONSUMPTION—A REPLY[1]

I

In the last issue of the BULLETIN, Mr. Harrod estimated that total consumption in U.K. in 1947 was down by 10.5 per cent below 1938, or 14 per cent per head.[2] This estimate was contrasted with the evidence produced in the National Income White Paper that personal expenditure on consumer goods and services at 1938 prices had risen slightly.[3] Mr. Harrod asserted that the White Paper estimates must be rejected in favour of his own. His central argument is statistical, but at the end of his article he says: ' This conclusion by no means jars with experience'. In estimates of this kind appeals to common experience are of relatively little value. For example, in 1945 a combined committee of the Combined Production and Resources Board, containing U.S., Canadian and British experts, made an elaborate and detailed study of ' The Impact of the War on Civilian Consumption '. This Committee estimated that annual per capita purchases in U.K. (at 1938 U.K. prices) between 1938 and 1944 fell by 16 per cent,[4] which is precisely the first of Mr. Harrod's figures for 1947. That per capita consumption last year was the same as in 1944 seems equally to jar with experience. Periods of rapid economic and social change are apt to give rise to optical illusions in social observers; but in any case, Mr. Harrod's appeal to experience is only brought in to confirm his statistical work. In this article, I shall therefore confine my attention to the statistical procedures.

The fundamental objection to Mr. Harrod's procedure is that it contradicts itself at a very early stage of the argument, the remaining calculations being rendered meaningless. This is explained in Section II of this article. No doubt most readers will regard this as sufficient to destroy any claim to validity for the final conclusion. It so happens, however, that Mr. Harrod's final ' fall in consumption ' is a good deal less than would be obtained by correcting the logic of his own method. Two lines of procedure are open. The first would be to re-state Mr. Harrod's method, free of contradictions, and then to criticise the economic reasoning which was implied. The second is to turn a blind eye to the early contradiction and to accept the method of the later stages at its face value. The latter course is followed here. This has the advantage of drawing attention to the extreme arbitrariness of the later procedure. It also permits the evaluation of the margin of error if Mr. Harrod's own method is followed exactly. Section III is mostly working over Mr. Harrod's procedure, and bringing out certain statements which are implied. An attempt is also made to show to what extent errors in the figures obtained in Mr. Harrod's Table IV alter the final conclusion, and it is shown that changes can be made in Table IV which are altogether plausible, and which produce either no ' fall in consumption ' at all, or else a fall much greater than 10.5 per cent. In Section IV there is a further list of errors made at various stages in the calculation : no attempt is made to follow up all of them. I do not, however, subscribe to the theory that the larger the number of errors in a calculation, the more accurate is the final result. Section V is quite independent of the rest of this article and deals with Mr. Harrod's attempt to reconcile his BULLETIN consumption estimates with the index of industrial production constructed by the *Economic Commission for Europe.*

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[1] My colleagues, Mr. J. Steindl and Mr. J. A. Hargreaves, have given me valuable help in preparing this note, which I gratefully acknowledge.

[2] In a letter to the *Economist* of April 24th, 1948, Mr. Harrod wrote that ' personal consumption must have declined by 12 per cent in total and consumption per head by 16 per cent '. In the issue of May 8th, 1948, he put the fall ' at 15 per cent per head, but subject to a margin of error '. In the last issue of the BULLETIN of the Institute of Statistics he presented his calculations in full and arrived at a figure of 14 per cent per head, but did not mention the existence or the size of the margin of error. In the *Economist* of May 22nd, Mr. Harrod referred to a fall of ' products for home consumption ' of 13 per cent per head below 1938. As will be shown below, this last figure is not directly comparable with any of the earlier estimates. Moreover, Mr. Harrod tells us that the calculations for the BULLETIN were made entirely *de novo*, but were similar to the earlier calculations the results of which were quoted in his first letter to the *Economist*. No importance therefore need be attached to the time sequence 16, 15, 14, 13.

[3] In working from figures of total consumption to consumption per head Mr. Harrod nowhere indicates whether he is dividing by total population, or civilian population. Between mid-1938 and mid-1947 the former increased by 4.7 per cent, the latter by 3.1 per cent. It seems from his figures that he is taking civilian consumption per head. We thus have a set of estimates for the fall in civilian consumption of from 9 to 12 per cent and of consumption per head of from 13 to 16 per cent between 1938 and 1947. The estimates of aggregate consumption are contrasted with the estimate contained in the National Income White Paper for 1947 (Cmd. 7371, Table 21) which shows a rise of 3 per cent in ' Personal expenditure on consumer's goods and services revalued at 1938 prices '.

[4] The 1948 White Paper gives the fall in personal expenditure in 1944 at 1938 prices as 16.8 per cent. The fall per capita of civilian population would on this estimate be about 11 per cent.

II.

The principal objection to Mr. Harrod's procedure is that an extremely simple test of the consistency of his figures is not satisfied. The object of the intricate procedure in the construction of Tables I to IV is to obtain an estimate of the fall in ' efficiency ' in the export trade. This fall is to be found by comparing the rise in the prices of exports with an index of the rise in the ' cost per man year of employment, assuming output per man year to be the same as in 1938 '. The latter figure is nothing else but the money value of exports per man employed. We know the change in the value of exports between 1938 and 1947 from the Trade Returns : the value, in fact, increased by 142 per cent. If, therefore, we knew the change in employment in exports we should be able to obtain the required index of cost per man year of employment.

Now this last figure is implicit in two very early stages in Mr. Harrod's calculation. (1) In moving from Table I to Table II he has to allow for the increase of total employed in industry. This figure is not stated explicitly but can be calculated from Mr. Harrod's tables : it turns out that he has assumed an increase of just under 4 per cent between 1938 and 1947. (2) In obtaining his Tables III and IV Mr. Harrod weights the ' volume of activity ' in the years 1938 and 1947 in the three sectors home consumption, net additions to capital, and exports, as 8 : 1 : 1 and 6 : 1 : 1 respectively. The 'volume of activity' is left in obscurity, but if the use to which Mr. Harrod puts these weights is to be logical they *must* refer to employment in the three sectors in the respective years.

Let T be total employment in industry in 1938: then according to (1) and (2) above employment in exports must have risen from $\frac{T}{10}$ to $\frac{T(1.04)}{8}$, *i.e.* by 30 per cent exactly.

It follows that the 'cost per man year of employment' in exports must have risen by $\frac{242}{130}$ *i.e.* to a figure of 186.2 (1938=100). But this is not the figure Mr. Harrod obtains as a result of his elaborate calculations. His figure is 202.3.

By the same token we can calculate the index of the cost per man year of employment in 1947 (1938=100) for 'home consumption'. Mr. Harrod's choice of weights implies that employment has fallen by 2½ per cent in this sector, while the 'national cost' of consumers' goods and services rose from £3,713 millions in 1938 to £6,161 millions in 1947. The correct index of cost per man year of employment is thus 170.2 against the figure of 172.4.

In the light of the above the construction of Tables III and IV appears as an elaborate device to modify two figures which, in view of the method used, are *already* fixed and unalterable. The practical effect of this mistake is that the final 'fall in consumption' is rather less dramatic than it would be if the mistake were corrected. Thus, if we were to obtain the fall in efficiency in exports as Mr. Harrod does, by comparing a price index of 230 with a 'cost per man year of employment' index of 186.2, we would get a fall in efficiency of 19 per cent. Following through to the end this gives a fall in consumption per head of nearly 20 per cent. Alternatively we might say: The volume of exports in 1947 was up by 8.6 per cent (Board of Trade Index), employment in export trade was up by 30 per cent (Mr. Harrod's assumption about weights); hence productivity per man was down by 16.5 per cent.[1] Either way we get a 'fall in efficiency' in exports considerably greater than Mr. Harrod's 12 per cent and a correspondingly greater fall in consumption. So much so, that had Mr. Harrod used his own method correctly he might well have had second thoughts about some of the assumptions he was making.

The critical assumptions are:

1. That employment in the 'export trades' rose by 30 per cent between 1938 and 1947.
2. That the export price index is 'fully reliable'.

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[1] It is worth noting how alternative means of estimating the same figure by different, albeit simple, routes give widely divergent results. As is well known, if price and quantity indices are constructed from the *same* data the product of the price and quantity indices will not be equal to the change in the total value (in this case of exports) unless the index numbers satisfy the factor reversal test. In this particular case neither the price nor the quantity index satisfy this test. Moreover, the weights used refer to different dates, and the price index refers only to a part of exports, while the quantity index is more comprehensive. Nowhere in his article does Mr. Harrod refer to the composition of any of the indices he uses,

3. That the change in efficiency in home manufacturing and mining is the same as in the ' export trades '.
4. That there was no change in efficiency in the remaining sector of production of consumers' goods and services for the home market.

It is significant that in Mr. Harrod's article it is just on these crucial points that he says least : there is no argument, but only assertion.

Thus, Mr. Harrod's estimate can hardly claim any validity. Nevertheless, since the practical effect of Mr. Harrod's mistake might be said to load the argument against himself it is worth while to examine other stages of it in more detail. In what follows, therefore, we shall abstract from the logical contradiction and discuss the procedures as they stand.

III.

With regard to the construction of Mr. Harrod's Tables I and II, there are several objections to the actual figures used, and these are made in Section IV. But the method is perfectly clear. It will be convenient to reproduce Tables I and II in symbolic form :

TABLE I

Average cost of production per man year of employment 1938

Wages	w'
Salaries	s'
Rent	r'
Profits and Interest	p'
Imports	i'
	100

TABLE II

Average money cost of production per man year of employment, assuming output per man to be the same as in 1938
1947 (base 1938)

Wages	w
Salaries	s
Rent	r
Profits and Interest	p
Imports	i
	c

The next move is to obtain a split between export prices and home consumption prices. In order to obtain a correct split Mr. Harrod rightly introduces a column for the prices of net additions to capital (although he does not need it for the remainder of his argument). He might well have considered a fourth column for ' Government consumption ', which has increased as a proportion of gross national product since 1938. However, he has only three columns and obtains Table III.

The elements in each row of this Table satisfy the conditions

$$8w_1'+w_2'+w_3'=10w' \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

etc.

TABLE III

Average cost of production per man year of employment 1938.

	(i) Home Consumption	(ii) Net additions to Capital	(iii) Export
Wages	w_1'	w_2'	w_3'
Salaries	s_1'	s_2'	s_3'
Rent	r_1'	r_2'	r_3'
Profits and Interest	p'	p'	p'
Imports	i_1'	i_2'	i_3'
	100	100	100

This condition is imposed by Mr. Harrod because he weights the 'volume of activity' in the three sectors in the proportions 8 : 1 : 1. Clearly further conditions may be specified about the elements of the table. For imports Mr. Harrod puts arbitrary figures for i_2' and i_3' and derives i_1' as a residual from the equations (1). He does the same for rents and salaries. In all these cases he gives his economic reasoning for the choice of the figures in columns (ii) and (iii). For profits, however, he makes no attempt to discriminate, *i.e.* he assumes profit margins to be the same in all three sectors of production (see Section IV). With the figures in the last four rows now fixed, the figures for wages, w_1', w_2' and w_3', are derived as residuals from the columns (which all total 100). Since the elements of the last four rows, and the totals, all satisfy equation (1), then the wages figures so obtained also satisfy equation (1).

Table III is complete. Now to get to Table IV.

TABLE IV

Average money cost of production per man year of employment, assuming output per man to be the same as in 1938.

	1947 (base 1938)		
	(i) Home Consumption	(ii) Net additions to capital	(iii) Exports
Wages	w_1	w_2	w_3
Salaries	s_1	s_2	s_3
Rent	r_1	r_2	r_3
Profits and Interest ...	p	p	p
Imports	i_1	i_2	i_3
	c_h	c_i	c_e

It is here that Mr. Harrod's account is incomplete. The information he gives is as follows. First of all, the individual elements must all satisfy the equations :

$$6w_1+w_2+w_3=8w \quad . \; . \; . \; . \; . \; . \; . \qquad (2)$$

etc. . . .

These equations correspond to the 1947 weights of the three sectors of production in the total. For *imports* : i_3 is obtained by raising i_3' by the full amount of the rise in import prices (148 per cent). Nothing is said about i_1 or i_2. For *profits and interest* : p is the same for each column and is obtained from Table II. Alternatively we may say that the profit elements in Table III are all raised in the same proportion, equal to the rise in the total cost figures in Table II. *Rent :* r_2 and r_3 are obtained by raising r_2' and r_3' in the proportion r to r'. r_1 is then obtained from equations (2). The same procedure is followed for *salaries*. Mr. Harrod does not describe in his text what he did about *wages*.

Table IV is still incomplete. The problem is to find i_1 and i_2, and w_1 w_2 and w_3. The following explanation is the only one I have been able to find which fits the arithmetic. *Import* costs in columns (i) and (ii) are assumed to have risen in the same proportion. Thus $\frac{i_1}{i_1'}=\frac{i_2}{i_2'}$. Together with the value of i_3

already put in and equations (2) we can determine i_1 and i_2. *Wages* are assumed to have risen all in the same proportion. Thus $\frac{w_1}{w_1'}=\frac{w_2}{w_2'}=\frac{w_3}{w_3'}=\lambda$ (say). Substituting these values of w_1, w_2 and w_3 in equations (2) we determine λ, and hence w_1, w_2 and w_3 are determined. The actual figure for λ is 1.90 which compares with an increase in the total wage item $\left(\frac{w}{w'}\right)$ of 1.96.

Whether or not I have guessed correctly what Mr. Harrod has done, it is quite clear that the procedure for wages is not the same as for salaries and rent. Presumably there is an economic reasoning which dictated one method for one item and another for the other two. It so happens that if the ' wages ' procedure had had been adopted for salaries and rents, there would be little difference in the final result. On the other hand, if the ' salaries and rents ' procedure had been followed the wages figure in column (iii) of Table IV (w_3) would be 87.2 instead of 84.5, and the figure for total cost of exports (c_e) would be 205.4 instead of 203.7. It follows from a formula obtained below that this alone would reduce Mr. Harrod's ' fall in consumption ' from 10.5 per cent to 9.6 per cent.

It will be seen that the foundations, upon which the next stage of the ' tightly interlocked ' calculations is to be built, are not altogether firm.

Mr. Harrod proceeds as follows. In Table IV he has arrived at three figures, c_h, c_i and c_e, which are the ' Average money cost of production per man-year of employment in 1947, assuming output per man to be the same as in 1938 (1938=100) ' for home consumption, net additions to capital, and exports respectively. These three figures must satisfy the equation

$$6c_h+c_i+c_e=8c \qquad (3)$$

where c is the average cost per man-year, calculated independently in Table II. c_h, c_i and c_e are not uniquely determined. On the contrary they can be altered by altering the estimates for the cost of imports or profits (or indeed wages, salaries and rents) in the columns of Table IV, provided always that in each row of those columns the three figures have a weighted average equal to the corresponding total of Table II. With respect to imports and rents and salaries indeed Mr. Harrod is at pains ' to weight the argument as heavily as possible against myself '.

Mr. Harrod does not explicitly say so, but it follows from the procedure actually adopted that an adjustment in one direction of c_e implies a (smaller) adjustment in the *opposite* direction of c_h.

The argument goes on. Let p_e be the index of export prices. Then the fall in efficiency in the export trade is given by $100\,\frac{p_e-c_e}{p_e}$ per cent. Mr. Harrod now argues that the *same* fall must have occurred in (roughly) manufacturing and extractive industries for the home market. The numbers employed in this sector for home production are given by Mr. Harrod as 6,982 thousand in 1947, which I shall call w_m. In the remaining industries serving the home market (agriculture, horticulture, fishing, distributive trades, commerce and finance, professional and personal service, entertainments, catering, laundries, etc.) Mr. Harrod assumes no loss of efficiency. The number employed in this sector is given as 5,557 thousand, which I shall call w_s.

The average loss of efficiency in the production of goods and services for home consumption is then obtained from the formula

$$\text{Loss of efficiency} = \frac{100\,\frac{p_e - c_e}{p_e}\,.\,w_m + O\,.\,w_s}{w_m + w_s}\ \text{per cent}$$

$$= \frac{100\,(p_e - c_e)\,w_m}{p_e\,(w_m + w_s)}\ \text{per cent}\ .\ .\ .\ .\ (4)$$

The next move is to estimate what the 1938 consumption would have cost if (1) costs per man-year of employment had risen as Mr. Harrod calculates them, and (2) if the above loss of efficiency is taken into account. This figure is :

$$3713\,\cdot\,\frac{c_h}{100}\,\cdot\,\frac{100}{100 - \frac{100\,(p_e - c_e)w_m}{p_e\,(w_m + w_s)}}$$

i.e. $T_h = 3713\,\cdot\,\frac{c_h}{100}\,\cdot\,\frac{p_e\,(w_m + w_s)}{p_e w_s + c_e w_m}$ where T_h is in units of £ million. The figure £3713 millions is the 'national cost' of consumer's expenditure in 1938. Now the actual consumer's expenditure in 1947, at 'national cost' was £6,161 millions. The percentage fall in total consumption is then given as:

$$\frac{T_h - 6{,}161}{T_h}\,.\,100\ \text{per cent} = 100\,\left(1 - \frac{6161}{T_h}\right)\ \text{per cent}$$

$$\text{i.e. } F = 100\left[1 - \frac{6161\,(p_e w_s + c_e w_m)100}{3713 \times c_h \times p_e(w_m + w_s)}\right]\ \text{per cent}\ .\ .\ (5)$$

For convenience we shall work in terms of F, the fall in aggregate consumption, and not in terms of the fall in consumption per head. In this formula p_e, w_m and w_s are given. The only variables are c_e and c_h. A rise in c_e implies a (smaller) fall in c_h and a reduction in F. A fall in c_e implies a rise in c_h and a rise in F. We shall first use this formula to show to what extent errors in Table IV affect the final result.

Putting in the particular values for p_e, w_s and w_m in the equation (5) we obtain

$$F = 100 - 40.17\,\frac{c_e}{c} - \frac{7353}{c_h}\ .\ .\ .\ .\ .\ .\ .\ .\qquad (5a)$$

We have also the equation

$$6c_h + c_i + c_e = 8c\ .\ .\ .\ .\ .\ .\ .\ .\qquad (3)$$

We shall assume that changes in c_e affect only c_h, and that c_i is constant. (To make a different assumption that, for example, c_h and c_i move in the same direction and in proportion, would make no difference in principle).

It follows that

$$6\,\Delta c_h + \Delta c_e = 0 \quad . \; . \; . \; . \; . \; . \; . \qquad (6)$$

Now from equation (5_a) above :

$$\Delta F = -\frac{40.17}{c_h}\Delta c_e + \frac{\Delta c_h}{c_h}\left(40.17\frac{c_e}{c_h} + \frac{7353)}{c_h}\right. = -\frac{\Delta c_e}{c_h}\left[40.17 + \tfrac{1}{6}(100-F)\right]$$

$$\simeq -\frac{\Delta c_e}{3}$$

Thus a change of 3 points in the index number of c_e, the cost per man-year of employment of exports, changes the estimate of the fall in consumption F by 1 point (*e.g.* instead of 10.5 per cent, the fall would be either 9.5 or 11.5 per cent).[1]

In my opinion the margin of error of c_e must be very large. In Section IV of this paper of some of the sources of error which arise in the construction of Table IV are listed. Here it is sufficient to consider only the profits item. It is surely reasonable to expect that, with extensive and energetic price controls in the home market, while export prices are left free, profit margins in the former will be below the average. Now a change of 1 point in the profit item in col. 1 of Table IV leads to a change of 6 points in the same item in col. 3 (assuming, that is to say, that the increase in profits in investment between 1938 and 1947 stays equal to the average increase in profits). And, as we have shown, a change of 6 points in c_e (which follows from raising or lowering the profits figure) leads to a change of 2 points in the consumption estimate.

Thus if the figure for profits in col. 1 of Table IV were 42.3 instead of 47.3 Mr. Harrod's fall in consumption would disappear. If there any evidence to suggest that 42.3 is a less reasonable figure than 47.3 ?

In short Mr. Harrod's consumption calculating machine is very highly geared. Small errors in certain figures may lead to large errors at the end.

We propose now to bring out certain implications of the argument which follows the construction of Table IV. As Mr. Harrod says, ' exports are a yardstick ' in his calculation. In particular he variously describes the index number of export prices as ' fully reliable ', and of ' mature vintage '. Let p_h be a 'reliable' index, for goods and services entering into home consumption. We can reverse Mr. Harrod's method and calculate p_h.

According to his argument the fall in efficiency in production for home consumption will be $\frac{p_h - c_h}{c_h}$. This must be the same as the figure obtained *via* exports. Hence : $\frac{p_h - c_h}{c_h} = \frac{(p_e - c_e)w_m}{p_e(w_m + w_s)}$

Putting in Mr. Harrod's values for p_e, c_e, w_m, w_s and c_h we obtain the index of prices of consumer goods and services in 1947 as 185 (1938=100). If instead of taking Mr. Harrod's c_e and c_h from his Table IV we took the values obtained by correcting his early mistake we would obtain an even higher figure. Now it is this $p_h = 185$ (at least) which must be contrasted with the White Paper national cost index of 161 for consumer goods and services. In view of the methods used in the construction of the White Paper national cost index this discrepancy (if it were correct) would be a very grave reflection upon the competence of the authors. It is hard to believe they could make mistakes of this size. Nor has it anything whatever to do with the failure to allow sufficiently for quality changes which Mr. Harrod at one point hints might be the explanation.

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[1] In the same way it can be shown that $\Delta F = \frac{\Delta p_e}{5}$ where p_e is the index of export prices.

The discrepancy is more easily explained by rejecting Mr. Harrod's figure. We have already shown how large the error may be. It is necessary only to look a little further at one or two of the crucial steps in the later argument.

The export price index has a curious fascination for Mr. Harrod. In a world of shifting values it stands firm in its reliability and maturity. It is contrasted with the ' postulated price changes ' of the White Paper. In fact the weights used in the export price index are truly postulated : ' From January 1947 onwards the estimated quantities of those items to be exported in 1948 have been multiplied by the unit value computed from the Trade Returns for the current month and for the base year 1938 ' (*Monthly Digest of Statistics*, Table 147). Does Mr. Harrod really prefer wine made from hypothetical 1948 grapes ?

Mr. Harrod argues that the fall in efficiency in manufacturing and mining for home consumption *must* be the same as any fall in the export trades. ' Where goods come from the various industrial processes, it is proper to assume a drop in the efficiency of producing goods for the home market equal to the drop in work done for exports '. This is an astonishing statement. The coverage of the export price index is roughly one half of the value of total exports. For Mr. Harrod's method to be sound his cost index c_e should cover the same range of goods. The total numbers given as employed in manufacture for export were roughly 1,700,000 in 1947. We would thus have evidence about efficiency in production requiring about 850,000 workers. Total employment in manufacturing industries was about 7,100,000. The export sample would be 12 per cent of the total ! We know moreover that the relative weights of different industries in export and home production are very widely different.

Almost as startling is Mr. Harrod's treatment of the remainder of production for the home market. For the agriculture and services item he makes what he calls an unplausible ' concession to the other side '. He assumes ' efficiency ' not to have fallen. Had he looked at the arithmetic of this he might have worded this passage differently. ' Productivity ' when measured as value of output at constant prices divided by numbers employed has risen noticeably in this sector. Some of Mr. Harrod's remarks about loss of quality obviously hold good, but he has overlooked the changed economic circumstances. In 1938 the economy was heavily under-employed, in 1947 it was over-employed. A high proportion of factors in services are fixed, *e.g.* the number of guards and drivers on a train is independent of the number of passengers : the number of usherettes in a cinema is almost independent of the size of the audience. In such cases a rise in demand induces a *rise* in average productivity of labour.

Finally, we go right back to the question of the choice of weights. It is well-known that to estimate the proportion of total employment going into exports is one of the most difficult tasks to set to any one working on British statistics. Mr. Harrod gives his guess with the comment ' . . . fine changes would not alter the general conclusion '!

IV.

Obviously the allocation of profits in Table IV is one of the major mistakes in its construction, and it happens to be one which, if corrected, is bound to reduce, or even eliminate, the ' fall in consumption '. It was chosen, however, for the purpose of illustration. There are in addition a good many specific points in reaching Tables III and IV which might give rise to considerable errors in the result and some of them are listed here.

1. The figures from the Main Table of the National Income White Paper are subject to varying errors. For example, the correct figures for Profits and Interest in 1947 will not be known until the final assessments are made by Inland Revenue. This will not be until late 1948, 1949, or even in some cases 1950. Meanwhile the authors of the White Paper are obliged to apply to the estimates for earlier years an index number. An idea of the errors involved can be obtained by comparing the estimates made for particular years in successive issues of the annual White Paper. If we express the difference between the highest and lowest estimates as a percentage of the mean estimate we obtain the following figures :

	1938	1940	1941	1942	1943	1944	1945	1946
National Income	6	7	9	9	1	1	2	2
Profits and Interest	17	20	23	10	7	5	2	4

The very large errors in earlier estimates are, of course, partly due to changes in definitions of particular items in the national income, *e.g.* profits, and in the national income itself. From 1943 onwards the errors have become smaller. Nevertheless they exist. Moreover the fuel crisis in 1947 may have made an abnormally large difference in profits, which may not be properly reflected in the profits index used. Errors in particular items may, to some extent, cancel each other out in Mr. Harrod's procedure. Errors in the total national income will not.

2. In Table I Mr. Harrod includes imports c.i.f. This involves double counting. Imports c.i.f. include the cost of British shipping bringing in imports, but these costs also appear under wages, salaries and profits and interest. Further, some imports are re-exported directly and ought almost certainly to be excluded. (The test is whether these re-exports are included

in the export price index used later in the argument.) On the whole it would be safer to take imports f.o.b.

3. Profits and Interest include income from foreign investments, etc. This should be taken out. Also income earned by civilians overseas, *e.g.* Control Commission for Germany, since very little of this income is spent in U.K.

4. To construct Table II an ' employment deflator ' is required to cover the change in the appropriate employment between 1938 and 1947. Mr. Harrod is content to take June 1939 as sufficiently representative of average employment in 1938, from which he obtains an increase in employment of 4 per cent between 1938 and 1947. I have attempted, from statistics of insured employed, the Armed Forces, Civil Defence, etc., for the years 1938 and 1939, to get a more accurate figure, and obtain an increase of 4 per cent between av. 1938 and June 1939. This gives us an increase of 8 per cent between 1938 and 1947.

5. In moving from Table I to Table III Mr. Harrod allots arbitrary figures for salaries and rent, for the costs of exports and net additions to capital. He also allots an arbitrary figure for the import cost in exports. He assumes constant profit margins (per man-year of employment) in all three branches of production in 1938. Is there any evidence at all about this ?

6. It is in moving from Table III to Table IV that a large number of possible errors arise. There is first the question of allotting wages to the three columns, which we noted in Section III. Then there is the assumption that profit margins in 1947 were the same in all three sectors. There is no evidence for this, and there are strong grounds for imputing to exports a much higher figure than the average in 1947.

7. Mr. Harrod contrasts his cost figures so obtained with the index of export prices and the White Paper index of the factor cost of consumer goods and services for 1947. This is illegitimate. The cost indices are based upon payments to factors in 1947, the price indices on goods sold in 1947. Now export prices were rising in this period about 18 per cent per annum, and consumer goods prices about 7 per cent per annum. The time-lags between payment of factors and sale of goods cannot be neglected. The import price figure should be taken somewhat *earlier* than the National Income figures for wages, salaries, etc. The resultant cost estimates would have to be compared with export prices in a *later* period, and retail prices later still. To do this ' lagging ' correctly is very difficult. But a very simplified example shows what is involved. If we were to assume that the ' average period of production ' were the same in exports and for home consumption and was, say, 3 months, the cost figures should be compared with an export price index of 240 and a factor cost index of 164.

8. In his working Mr. Harrod has paid no attention to Government consumption which has risen considerably as a proportion of net expenditure since 1938. Profits are a much smaller element here than elsewhere and this must further affect the allocation of profits in Table IV.

The above list of possible errors is not exhaustive. Of course, the errors may not all be cumulated : errors in some items imply errors in others which will fully or partially compensate in the final result. If, for example, we simply correct the figures according to items 2, 3 and 4 above and for the rest follow Mr. Harrod's procedure exactly, we arrive at a fall in total consumption of 8¾ instead of 10½ per cent. On the other hand, using Mr. Harrod's Table IV and taking an export price index of 240 we arrive at a fall in total consumption of 12½ instead of 10½ per cent.[1] These two alterations were again picked at random and little need be made of the fact that they work in opposite directions. The burden of our criticism does not rest on any particular alterations to the figures. We note only that there are a great many sources of error and that these errors may make large differences in the final result.

V.

In a letter to the *Economist* of May 5th I referred to the difficulty of reconciling the index of industrial production constructed by the *Economic Commission for Europe* with Mr. Harrod's calculations. Mr. Harrod published a reply on May 22nd, giving some figures which are not easy to understand, but in any case disagreeing.

The point in mind was as follows. According to Mr. Harrod ' efficiency ' in a wide range of manufacturing and extractive industries declined by 12 per cent between 1938 and 1947. By ' efficiency ' I take Mr. Harrod to mean real output per man-year of employment. The E.C.E. index shows an increase of 10 per cent in industrial production.[2] If efficiency were down by 12 per cent the total employment required to produce this increased output would have to have risen to $110\times\frac{100}{88}=125$, *i.e.* by 25 per cent. The full details of the E.C.E. index are not published but we do know that it contains ten broad industrial groups. In the following table these have been formed into six larger groups for which employment statistics are readily available in the *Monthly Digest*.

Increase (+) *or Decrease* (—) *in Employment in 6 broad industrial groups. June* 1939 *to June* 1947*

Mining and Quarrying (I)	— 44,000
Metal and Chemical Industries (II, III, IV and VII)	+676,000
Building and Civil Engineering (V)	+ 30,000
Textile and Clothing (VI and VIII)	—222,000
Food, Drink and Tobacco (IX)	— 27,000
Gas and Electricity (X) and Water	+ 17,000
Total	+430,000

* The roman numerals in brackets indicate the groups of the E.C.E. table. This table has a wider coverage in some respects : it may also exclude some workers whose production is covered by the index. These differences cannot be very large.

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[1] The export price index covers roughly one half of total exports (in value). It is possible to calculate from the published statistics an index of wider coverage, with 1938 weights. This index comes to 238. Allowing a 3-months time lag this would give a fall in total consumption of 14 per cent.

[2] Actually E.C.E. give estimates only for the first 3 quarters of 1947. If we assume that this index increased in the 4th quarter in the same proportion as the Official Interim Index

The table shows an increase in employment of 430,000 on a June 1939 total of 6.7 million, *i.e.* of about 6½ per cent. A rough estimate suggests that the increase av. 1938 to June 1939 cannot have been much more than 5 per cent. At most employment in those industries between 1938 and 1947 increased by about 12 per cent, which is only half the increase required by the attempt to reconcile the E.C.E. index with Mr. Harrod's assertions about productivity. He might have had better luck if he had taken the index of the *London and Cambridge Economic Service*, which includes more items and has different weights. This index shows little change in industrial production between 1938 and 1947. I should, however, add that Mr. Reddaway[1] points out that while the L.C.E.S. index may be used to make a very tentative estimate of the change in productivity between 1935 and 1947 it is not, in his opinion, possible to make comparisons between later years, *e.g.* 1938 and 1947. This was the point I had in mind.

Mr. Harrod does not attack the reconciliation problem in this way. Instead he says : ' If we take that index as showing total British industrial production in 1947 at 108 (base 1938) we may suppose that products for home consumption were at about 97 (owing to the diversion of resources towards export and capital accounts), viz., 3 per cent down '. I fail to understand the reference to a diversion to export. According to the Board of Trade the volume of exports in 1947 was 108.6 (1938=100).

We need not quarrel about this. Let us accept a fall of 3 per cent in industrial production destined for home consumption. Now, says Mr. Harrod, ' allowing for quality, this may be 9 per cent down, or 13 per cent per head '. Presumably Mr. Harrod wishes this figure to be taken as a confirmation of his previous estimates. Otherwise it is hard to understand why he stopped there (after a fleeting reference to reduced imports).

If that was the impression he intended to convey serious exception must be taken on two grounds. First, in the BULLETIN Mr. Harrod worked out his estimates of consumption changes entirely by arithmetic. Quality changes were held over until the arithmetic was finished. ' It must be noticed ', he writes, ' that if exports are of inferior quality the reduction in consumption must be *pro tanto* greater, since exports are the yardstick in this calculation.' But in the letter to the *Economist* of May 22nd a quality fall of 6 per cent is introduced *into* the calculation in order to get his 13 per cent fall.

Secondly, we must look more closely at what it is that has fallen by 13 per cent per head. If it is anything, it is that part of industrial production destined for the home market. It certainly excludes item 4, and items 9 to 14 inclusive of the White Paper Table 21,[2] and may well exclude some of the

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of Production (base year 1946, post-war weights) the E.C.E. figure for 1947 would be 110.4. Alternatively if we take the 4th quarter of 1946 to the 3rd quarter of 1947 inclusive E.C.E. gives 109.3. We do not know how Mr. Harrod obtains 108 for 1947.

[1] *London and Cambridge Economic Service Bulletin*, May, 1948.

[2] The items are : 4, Rent, Rates and Water charges. 9, Books, Newspapers, etc. 10, Private Motoring. 11, Travel. 12, Communication services. 13, Entertainments. 14, Other services.

other items.[1] The total expenditure at 1938 prices on the items specified (which represented one-third of total personal expenditure in 1938) increased by £129 million, *i.e.* by 9 per cent. Accepting, solely for the sake of argument, Mr. Harrod's figure of a fall per head of 13 per cent, in two-thirds of consumption, and a rise of 5 per cent per head in one-third (this is loading the calculation in his favour) this would lead to a fall in total consumption per head of 7 per cent, which already makes some allowance for deterioration in quality. Even Mr. Harrod's own figure contradicts his other estimate. Moreover, if we disallow the fall of quality in the calculation we would reach the result that consumption per head had fallen by 3 per cent, which hardly differs from the White Paper !

Conclusion

There may well be errors in the White Paper estimates of ' Personal expenditure on goods and services at 1938 prices '. It would be surprising if there were not. But it does appear from the notes accompanying the White Paper Tables that considerable care has been taken to make the estimates as accurate as possible. The estimates stand until evidence is produced to the contrary. In my opinion Mr. Harrod's article contains no evidence.

G. D. N. Worswick.

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[1] Mr. Harrod refers to reduced imports for domestic consumption. This can only mean imports which go through no industrial process covered by the E.C.E. index. He does not mention the increase in domestic agricultural production, much of which reaches the consumer without going through an industrial process covered by the E.C.E. index.

COMMENTS ON MR. HARROD'S PAPER

1. Mr. Harrod writes: 'The White Paper (on national income) concludes that total personal consumption is slightly up', *i.e.* higher in 1947 than in 1938. This is untrue. The authors of the White Paper have always been too conscious of the pitfalls of welfare economics to make any such claim. All that the White Paper does is to show that $\Sigma p_{38}\ q_{47}$ is greater than $\Sigma p_{38}\ q_{38}$ where the p's represent the prices of consumer goods and services, the q's their quantities and the subscripts represent the years 1938 and 1947. Moreover, the specific caution is added[1]: 'The fact that the 1947 aggregate is rather higher than the 1938 figure does not, in itself, mean that standards of consumption were by 1947 back at their pre-war level. It means simply that the particular collection of goods and services actually bought in 1947 would, if bought in 1938, have cost rather more than the goods and services that consumers in fact prepared to buy in that year.' But Mr. Harrod writes loosely, and one must, I think, assume that when he denies so hotly that consumption can have risen (whatever this may be interpreted to mean) he is really disputing the much more limited proposition contained in the White Paper.

2. A larger proportion of our resources is now being devoted to export, to capital outlay[2] and to government services than before the war, he asserts. 'How then is it possible that personal consumption should not be down? Surely all these claims on our resources cannot have been met by the pre-war unemployed who have been taken into work?'

One rhetorical question deserves another. Has he forgotten that this country ran a deficit on foreign account of £675 million last year, as compared with £70 million in 1938? Does he not realise, to put it another way, that the equivalent of about 45 per cent of the f.o.b. value of our imports in 1947 was paid for, not out of current earnings, but by a draft on our future earnings, and that the comparable figure in 1938 was under 10 per cent.

3. Mr. Harrod finds a 'discord' between the price index of consumers' goods and services shown in the White Paper and the 'reliable' index of export prices published by the Board of Trade. One could say a lot of things about this. In the first place, there is no particular reason why, in a period of rising prices, a retail price index should show close agreement with a wholesale price index: one would expect a lag between movements in wholesale prices and movements in retail prices. Secondly, export prices are subject to no control by the Government; many retail prices still are, and even though some prices slip through the net there is no reason to suppose that all do.

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[1] *Cmd.* 7371, p. 42.

[2] It should be added that Mr. Harrod habitually exaggerates the extent to which current real resources are being devoted to providing additions to assets. The provision for depreciation included in the White Paper is calculated on the original cost and not the replacement cost of assets. To the extent that it does not cover replacement at current prices the increment of value of capital equipment (the White Paper figure of net capital formation) exceeds the value of the increment. It was doubtless for this reason that Tables 1 and 2 in this year's White Paper were expressed in terms of gross national product in spite of the duplication of depreciation allowances involved.

Thirdly, the composition of exports is strikingly different from the composition of home consumption. No services are exported, very little food, very little tobacco, hardly any coal : on the other hand many highly priced luxuries are never permitted to reach the home market.

It is possible to make a partial correction for this last factor by using the breakdown of consumers' expenditure at both current and at 1938 prices given in the White Paper, *i.e.* by excluding food, beer, tobacco, rent, rates and water charges, fuel and light, travel, communication services, entertainments, other services, income in kind of the Armed Forces and the 'adjustment' and by computing the market price index for the remaining groups of expenditure. This turns out to be 195 as compared with the figure of 168 applicable to the whole of consumption.

4. Mr. Harrod supposes that the White Paper figure is too low because 'the authorities do not get reports of many high prices that are actually being charged to consumers. . . The prices for 1938 may be all right, but can we be sure that those for 1947 were ?' It should be explained that the estimates of expenditure at 1938 prices are not all made by the same method.[1] In some cases estimates of actual expenditure at current prices are deflated by an index of the change in prices since 1938. In other cases the actual quantities bought in 1947 are revalued at their 1938 prices. Where this is so the estimate of $p_{38}\ q_{47}$ is quite independent of 1947 prices, and to suggest that the rise in prices has been under-estimated is not to suggest that 'consumption' in 1947 has been over-estimated. This is so in the case of food, drink, tobacco, rents, rates and water charges, fuel and light, matches, soap, newspapers, magazines, private motoring and domestic service. Expenditure on these groups amounted in 1947 to over £2,800 million at 1938 prices. The price indices needed to deflate expenditure on certain other items (travel, communication services and entertainments) are rather exactly known. These items account for another £374 million at 1938 prices. The region where underestimation of prices can have affected the comparison between $p_{38}\ q_{47}$ and $p_{38}\ q_{38}$ is not awfully big.

5. So far I have discussed only Mr. Harrod's comments on the White Paper estimates. Now I come to his own calculations.

He takes the 1938 estimates of wages, salaries, private rents, private profits and interest (other than national debt interest), adds them to imports, valued c.i.f., and expresses each component as a percentage of the total. It is worth writing down the composition, of this total in a rather different way in order to see what an illogical mélange it is. It consists of the following :

the net product of enterprises[2]
less public authorities' income from property
plus net rents of dwelling-houses
plus wages of domestic servants

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[1] For a fuller discussion of this point see *The Impact of the War on Civilian Consumption in the United Kingdom, the United States and Canada.* H.M.S.O., 1945.

[2] This concept is defined in *Cmd.* 7099, footnote (1) to Table 7 but not quite correctly. Clearly only net income from abroad and not gross income should be excluded.

plus wages and salaries of civil servants
plus interest on local authorities' debt
plus net income from abroad
plus f.o.b. value of visible imports
plus insurance and freight on British imports[1]

6. Mr. Harrod then takes the comparable 1947 figures for his 5 items, knocks about 3½ per cent off each to allow for changes in employment between 1938 and 1947 (surely not quite half enough, but let it pass) and then expresses each as a percentage of the odd total defined above, which we may for convenience refer to as Mélange 1938.

7. Mr. Harrod finds that Mélange 1947 is 177.806 per cent of Mélange 1938. This he interprets to mean that the money-cost of production per man-year of employment was, in 1947, 77.806 per cent above the 1938 level, provided that output per man was unchanged.[2]

This is already a doubtful step, since the coverage of Mr. Harrod's Mélange is not the same as the coverage of the term ' output ', either ' gross ' or ' net '. Moreover, Mr. Harrod does not say whether he is assuming constant gross output per man or constant net output. Productivity is usually reckoned in terms of net output; on the other hand constant net output together with a fall in imports would give a fall in Mélange at constant prices, so that one must, I think, assume that Mr. Harrod is thinking of something grosser than net output, *i.e.* is failing to distinguish changes in productivity, as normally understood, from changes in the terms of trade.

8. Mr. Harrod now wants to split each of the items in Mélange 1938 between consumption, net capital formation and exports—undeterred by the obvious fact that these three groups of expenditure do not by any means exhaust his total. He decides, on what principle is unexplained, to give consumption a weight of 8 and capital formation and exports each a weight of 1. This is equivalent to solving for 15 unknowns in 8 equations of the following form:

$$8c_n+i_n+e_n=10k_n \qquad (n=1, 2, \ldots, 5) \qquad \text{5 equations}$$
$$\Sigma c_5=\Sigma i_5=\Sigma e_5=1 \qquad \text{3 equations}$$

where only the k's are known.

He does it, essentially, by writing in arbitrary values,[3] for i_2, i_3, i_4, i_5, e_2, e_3, e_4 and e_5 and then solving for the remaining variables; 'wages is,' he explains ' the residual figure '. This must be one of the few cases on record where a residual figure is not subject to greater error than those figures directly estimated.

9. Mr. Harrod then does a similar calculation for Mélange 1947. As

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[1] Most of this, of course, is already included in the net product of enterprises as part of the output of British shipping and insurance companies.

[2] Output in this sense must include the output of services as well as of goods. Later in the argument Mr. Harrod seems to forget this.

[3] It is unclear why he made arbitrary guesses always instead of referring to, for example, the 1945 White Paper on National Income (*Cmd.* 6623) which does in fact allocate imports (f.o.b. imports, naturally), between consumption, government expenditure, capital formation and exports.

before, he has 15 variables, but this time he has only 5 equations. These equations are the same in form as the first five set out above, but have different values for the k's on the right-hand side and for the constants : consumption now gets a weight of 6, investment of 1 and exports of 1, so that the equations are $6c'_n+i'_n+e'_n=8k'_n \quad (n=1, 2, \ldots 5)$
The process of ' solution ' is to write in arbitrary values[1] for ten of the variables and derive the other five. Mr. Harrod then adds the five equations together and so ends up with a single equation :

$$6C+I+E=8\,(178)$$

where $C(=\Sigma c')$, $I\ (=Ei')$ and $E\ (=\Sigma e')$ are the calculated price indices of consumption, net capital formation and exports respectively, and

$$178\ (=\Sigma k'=100 \text{ Mélange } 1947 \div \text{Mélange } 1938)$$

is the assumed price index of output as a whole.

10. It now turns out that the government statisticians have been wrong all along the line. C works out at 172.4, as compared with the White Paper 161, which is naturally wrong, therefore. Even the Board of Trade estimate of the export price index, previously 'wholly reliable' (*i.e.* totally free from error: how the Board of Trade statisticians must have chuckled to read this !)[2] is now found to be a few points too high.[3] Clearly, those few points measure the fall in the efficiency of British exporters ![4]

11. Now no one would suggest that government statistics are infallible : it is a commonplace that all estimates, whether official or unofficial, and however carefully made, are subject to error. It is well-known too that residual estimates derived as a by-product of other calculations are particularly subject to error, and that for this reason the White Paper estimates of private net capital formation are especially vulnerable. There is much scope for further research, scope too for further refinement of the concepts used in work on national income. But it is disappointing to those who hope to see economics generally recognised as a science to find an economist of Mr. Harrod's eminence offering to a wide and respectful public as a correction of the rigorously defined and, by common consent, objective official calculations an estimate of the ' fall ' in consumption involving the accumulated error

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[1] Some of the particular assumptions made are just worth noticing. Thus, wage-costs are assumed to have risen by the same percentage between 1938 and 1947 in all sectors—home consumption, capital goods and exports. Production for home consumption is assumed to have been more profitable in 1947 than in 1938 and production for export less profitable : this although price-controlled utility goods, for example, have not been allowed to reach the export sellers' market and many luxuries have been kept off the home market. The import-content of exports is assumed to have been higher in 1947 than in 1938 in spite of the striking fall in textile exports and the equally striking rise in exports of metal goods.

[2] This index, although of ' mature vintage ' is weighted according to the expected composition of exports in 1948.

[3] It so happens that if C is put equal to 161 (The White Paper figure), and E equal to 230 (the Board of Trade figure), I works out in this equation at 220—surely a quite plausible figure (for *gross* capital formation at any rate). I offer this as a *curiosum* only and not as a ' proof ' that the official figures are right. For Mr. Harrod's weights are quite arbitrary.

[4] An economist less convinced of his own infallibility would, at this point, have seen a snag ; If British exporters manage to get more for their products than they ' ought ', they can hardly be said to be inefficient.

of at least 11 separate and quite arbitrary assumptions.[1] Even if Mr. Harrod's logic were impeccable and his assumptions based on known facts his final estimate would still be subject to far greater error than the direct estimate given in the White Paper and at most he could claim to have made out a *prima facie* case for suspecting an inconsistency in the White Paper calculations.[2] But as in fact Mr. Harrod's logic is very far from impeccable and as he himself goes out of his way to say that he thinks many of his assumptions unplausible[3] even this modest claim cannot be admitted.

E. F. JACKSON.

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[1] These are: the postulated rise in employment between 1938 and 1947 (which is quite certainly very far out), the values of two constants and seven variables in his equations Melange 1947, and the postulated change, between 1938 and 1947, in productivity in agriculture and the service trades.

[3] Mr. Harrod's reluctance to make the assumptions that he himself thinks most plausible sometimes saves him from even wilder assertions. Thus, he assumes that productivity in the service trades remained constant between 1938 and 1947 although he believes it to have fallen. But it would have been more sensible still to admit what I had thought was obvious —that in many cases it rose considerably. The consequences of this rise (cinema queues, uncomfortable railway journeys) are clearly sometimes unpleasant: this is just another way of saying that new investment in cinemas and rolling stock has not kept pace with the rise in consumer demand. The resulting decrease in the leisure of professional men may be very real but is irrelevant to the argument since no one has yet thought of a way of imputing a value to leisure.

[3] Even this is not quite accurate. Mr. Harrod's conclusion is that consumers' 1938 expenditure, revalued at 1947 prices, exceeded actual 1947 expenditure, *i.e.* that Laspeyre's ratio, $Q_L (= \Sigma p_{47}q_{38}/\Sigma p_{47}q_{47})$ is less than unity. The White Paper concluded that actual 1938 expenditure was slightly lower than 1947 expenditure revalued at 1938 prices, *i.e.* that Paasche's ratio, $Q_P (= \Sigma p_{38}q_{47} / \Sigma_{38}q_{38})$, is greater than unity. It is well-known that these two ratios, even if both are equally carefully calculated, cannot be expected to be equal. In other words, even if Mr. Harrod's estimate of Q_L were a good one, it would throw no doubt on the White Paper estimate of Q_P, and the difference between them could certainly not be interpreted as a measure of the extent to which the compilers of the White Paper under-estimated changes in quality or prices. The accepted interpretation of the particular case where $Q_P > 1 > Q_L$ is that information is not then sufficient to show whether welfare has risen or declined. (See J. R. Hicks, 'The Valuation of Social Income', *Economica*, May 1940, Vol. VII (New Series), No. 26, pp. 105–124). In the present instance Q_P is known to be a better estimate than Q_L and the ambiguity is therefore not proven.

I would add that it is usual in comparisions of welfare, for the reasons given by Mr. Hicks, to use market prices rather than factor costs.

TABULAR APPENDIX.

EDITORIAL NOTE

Tables comparing the broad trends of production, prices and wages, the volume of foreign trade and the supply of coal for a number of European countries, the United Kingdom and the U.S.A. are given below. For some countries more up-to-date figures are available than for others. These time lags will, it is hoped, be reduced in future and the tables will be extended when more information becomes available. This index numbers are based as far as possible on 1938.

Explanation of symbols :

... the figure is not available.

(—) figures provisional or approximate.

– figure is negligible.

Table I

Industrial Production (or Employment)
Index Number : 1938 = 100

Index Numbers	Monthly Averages				1947		1948		
	1939	1945	1946	1947	June	Dec.	Jan.	Feb.	Mar.
Industrial Production[1]									
U.S.A.[2]	122	228	191	210	207	216	217	218	216
United Kingdom[3]	...	...	100	109	116	116	119	125	119
France[4]	...	46	81	95	97	90	105	112	110
Belgium	105	38	88	105	104	112	114	113	120
Netherlands	111	30	73	92	91	103	103	100	103
Denmark	105	74	97	112	109	120	123	125	124
Sweden	106	91	110	111	112	110	110	114	115
Norway[4]	107	69	100	115	122	115	117	132	129
Finland[5]	...	52	70	86	82	99	...	...	...
Poland[6]	...	48	91	121	115	132	141	...	...
Bulgaria	106	...	122	141	151	154	128	136	145
Italy[7]	100	...	47	61	68	64	61	...	...
Germany[8]	...	...	33	38	39	43	44	45	48
Austria[9]			58	71	77	79	84	83	...
Industrial Employment :									
Switzerland[10]	98	110	123	134	132	136	...	...	136
Czechoslovakia[11]	...	...	86	95	94	103	100	...	...
Great Britain[12]	100	100	97	104	104	106	107	107	107

Sources : Official Statistics. For Belgium : Institut de Recherches Economiques et Sociales, Louvain ; for *Sweden* : Sveriges Industriförbund ; for *Finland* : Unitas ; for *Germany* : Control Commission (British Element) ; for *Italy* ; Confederazione Generale del' Industria Italiana ; for *Austria* ; Monatsberichte des Oest. Institutes für Wirtschaftsforschung.

[1] Mining and Manufacturing, except Denmark (manufacturing only), and Netherlands (mining, manufacturing and public utilities), see also note 3.

[2] Adjusted for seasonal variations.

[3] Interim Index of industrial production (mining, manufacturing, building and public utilities) 1946 = 100.

[4] Adjusted for number of working days.

[5] Total (export and home) industry ; seasonally adjusted.

[6] New sseries.

[7] 1939 = 100 provisional figures.

[8] Bizonal Area 1936 = 100.

[9] Industrial key materials, 1937 = 100.

[10] Wage earners employed in manufacturing and building. Quarterly figures.

[11] Total employment in manufacturing, mining and building, 1937 = 100.

[12] Employment (including employers and self-employed) in manufacturing. June 1939 = 100 ; all annual figures refer to June.

TABLE II

Wholesale Prices[1]
Index Numbers : 1938=100

Index Numbers		Monthly Averages				1947		1948			
		1939	1945	1946	1947	June	Dec.	Jan.	Feb.	Mar.	Apr.
U.S.A. ...	a[2]	98	135	154	193	188	208	211	204	205	207
U.K. ...	a	101	167	173	189	187	201	209	214	214	216
	b[3]	91.5	138	142	155	154	166	172	176	177	178
France ...	a	105	375	648	989	904	1217	1463	1537	1536	1555
	b	92	(275)	189	289	265	355	427	249	249	252
Holland ...	a	102	177	245	266	264	274	273	273	273	...
	b	99	(122)	169	183	181	188	187	187	187	...
Switzerland	a	104	206	201	209	208	218	220	220	220	220
	b	103	...	204	213	212	222	224	224	224	224
Sweden ...	a	103	174	168	179	180	185	187	187	187	191
	b	98	...	173	199	199	204	205	206	206	211
Denmark	a	105	190	188	207	205	216	216	217	218	221
	b	98	...	180	198	196	207	206	207	208	211
Norway ...	a	102	177	168	175	175	178	180	180	182	182
	b	97	...	138	144	144	147	148	148	149	149
Finland ...	a	106	386	605	724	685	886	900	906	942	946
	b	98	...	207	248	235	304	309	311	324	326
Czech'slvkia	a	115	173	295	313	307	318	322	322	323	322
	b	114	...	170	181	178	184	187	187	187	187
Italy ...	a	...	...	...	5158	5329	5526	5373	5343	5355	...

[1] Prices expressed in national currencies and in U.S. dollars at official rates.
[2] a=in national currency. [3] b=in U.S. currency.

TABLE III

Wages

Index Numbers[1]	Monthly Averages				1947		1948		
	1939	1945	1946	1947	June	Dec.	Jan.	Feb.	Mar.
U.S.A.[2]	101	163	173	195	196	204	205	206	206
United Kingdom[3] ...	...	149	161	168	166	173	174	174	175
Switzerland[4]	100	146	160	174	172	178	...	...	180
France[5]	...	328	448	525	460[6]	525[7]	...	...	...
Netherlands[8]	100	131	163	168	167	174	175	175	175
Czechoslovakia[9]	100	182	304	314	315	317	317	317	317

[1] Base periods : U.S.A. and France : 1938=100 ; United Kingdom : September 1939=100 ; Switzerland : January–August 1939=100 ; Netherlands : 1938–9=100 ; Czechoslovakia : March 1939=100.
[2] Average hourly earnings in manufacturing.
[3] Weekly wage rates ; Ministry of Labour (all industries).
[4] Hourly rates in industry ; quarterly figures.
[5] Hourly rates for men in Paris. The annual figures refer to October.
[6] April. [7] October. [8] Hourly rates in industry. [9] Hourly rates in manufacturing.

TABLE IV

Foreign Trade

Volume Index (Deflated Values : 1938=100)

Index Numbers		Monthly Averages				1947		1948		
		1939	1945	1946	1947	June	Dec.	Jan.	Feb.	Mar.
U.S.A.	Imports	114	130	139	133	130	152	149	150	164
	All Exports	105	183	191	238	261	219	199	195	210
U.K.	Imports	97	62	69	77	77[1]	77[2]	...	...	80[3]
	Exports	94	46	99	108	102[1]	117[2]	...	...	126[3]
France	Imports	88	34	112	117	132	98	...	...	...
	Exports	99	10	43	82	92	79	...	...	...
Switzerland	Imports	118	31	105	147	148	178	173	146	175
	Exports	97	57	101	115	126	145	97	102	123
Denmark	Imports	98	21	86	82	121	86	68	64	65
	Exports	101	32	60	68	72	72	54	75	70
Sweden[4]	Imports	117	30	94	124	127[1]	120[2]	...	...	...
	Exports	108	50	66	73	69[1]	88[2]	...	...	65[3]
Norway	Imports	111	46	78	118	146	112	71	86	88
	Exports	108	19	61	81	113	77	84	89	77
Poland	Imports[5]	...	97[6]	159	128	233	125	...	...	...
	Exports	...	17[6]	34	55	67	67	...	...	...
Czechoslovakia[7]	Imports	...	...	35	77	76[1]	80[2]	...	...	...
	Exports	...	...	26	56	58[1]	60[2]	...	...	...
Hungary	Imports	...	1	16	52	53	49	62	76	62
	Exports	...	...	15	26	27	41	35	33	42
Austria[7]	Imports	...	...	...	24	23[1]	32[2]	34	36	39
	Exports	...	...	...	29	26[1]	44[2]	31	37	48

[1] Average of 2nd quarter. [2] Average of 4th quarter. [3] Average of 1st quarter.
[4] Revised figures. [5] Incl. U.N.R.R.A. deliveries.
[6] Monthly average of 3rd and 4th quarter. [7] 1937=100.

TABLE V

Production of Steel (*Ingots and Castings*)

Thousand metric tons	Monthly Averages				1947		1948			
	1937	1938	1946	1947	June	Dec.	Jan.	Feb.	Mar.	Apr.
U.S.A.	4282	2400	5035	6410	6322	6682	6779	6296	6902	5651
Great Britain ...	1101	881	1074	1057	1032	1234[1]	1142	1175	1478[1]	1176
France	660	518	367	479	463	408	552	564	626	(640)
Belgium	322	190	190	241	232	296	314	293	327	...
Luxembourg ...	209	120	108	143	147	168	166	170	195	...
Sweden	94	83	101	99	95	117	103	107	104	...
Poland	122	120	102	132	127	140	155	147	...	...
Czechoslovakia ...	192	153	139	190	186	191	216	205	225	233
Hungary	55.4	54.0	29.4	49.7	50.3	50.8	59.8	58.5	...	...
Italy	175	194	96	142	159	143	142	164	...	...
Austria	54.1	...	15.6	29.7	28.6	40.5	47.0	46.8	49.4	49.6
Germany :										
British Zone ...	1156[2] [3]	...	198	232	209	271	287	282	343[3]	363[3]
U.S. Zone ...	59[2]	...	21	32	31	39	40	40		

Source : U.N.O. Monthly Bulletin and other official statistics.
[1] Five weeks. [2] 1936. [3] Without castings.

Table VI

Coalmining and Supplies

A. Hard Coal Output

Monthly Figures or Averages[1]

Million metric tons	Average 1946	Average 1947	1947 July	1947 Dec.	1948 Jan.	1948 Feb.	1948 Mar.	1948 Apr.	Apr. as % of 1935–38
U.S.A.[2]	44.8	51.1	39.9	54.1	54.3	48.1	35.3	35.4	103
United Kingdom ...	16.1	17.0	13.5	19.3[4]	16.7	16.7	19.9	17.3	89[4]
West Germany[3] ...	4.5	5.9	6.1	6.6	6.6	6.4	7.2	7.0	68
France[2]	3.9	3.8	3.8	3.1	4.6	4.1	4.3	5.4	112
Saar	0.7	0.9	0.9	0.9	1.0	0.9	0.9		
Belgium	1.9	2.0	1.8	2.1	2.2	1.7	2.3	2.3	98
Holland	0.7	0.8	0.9	0.8	1.0	0.9	1.0	1.0	87
Poland	3.9	4.9	5.0	5.2	5.7	5.2	5.8	5.8	115
Czechoslovakia ...	1.2	1.4	1.3	1.4	1.5	1.4	1.6	1.6	143

B. Total Imports of Solid Fuels including Bunkers (ton for ton)

Monthly Figures or Averages

Thousand metric tons	Average 1946	Average 1947	1947 July	1947 Dec.	1948 Jan.	1948 Feb.	1948 Mar.	1948 Apr.	Apr. as % of 1935–38
France	867	1283	1624	1507	1234	1467	1448	1059	53
Belgium	262	462	396	674	473	421	465	237	45
Holland	268	330	365	311	220	300	448	277	39
Luxembourg ...	154	187	217	204	233	231	221	242	95
Norway	157	203	296	127	77	128	182	192	75
Denmark	314	363	442	293	291	240	351	369	78
Sweden	287	495	755	657	542	557	553	557	85
Switzerland ...	128	210	212	284	273	199	242	259	95
Italy	471	749	905	759	673	403	813	452	41
Finland	68	132	190	230	124	43	49	168	116
Portugal	48	76	105	50	47	53	81	53	49

C. Exports of Solid Fuels excluding Bunkers (ton for ton)

Monthly Figures or Averages

Thousand Metric tons	Average 1946	Average 1947	1947 June	1947 Dec.	1948 Jan.	1948 Feb.	1948 Mar.	Mar. as % of 1935–38
U.S.A.	4105	5919	6870	3860	3100	2910	...	...
Thereof to Europe ...	1370	2811	3380	2861	2307	1939	2288	...
U.K.	385	94	75	161	293	340	436	13
West Germany[3]	972	880	102	1142	1053	1332	1517	59
France	32	38	43	9	10	10	40	40
Saar[5]	119	115	107	197	24	27	27	22
Belgium	78	172	171	148	123	102	128	25
Holland	36	48	61	91	108	69	73	14
Poland	1277	1900	2178	2119	2210	2088	2350	...
Czechoslovakia	55	131	115	177	225	188	188	56

Source : European Coal Organisation ; United Nations Monthly Bulletin of Statistics.

[1] Calendar months. [2] Including a small quantity of lignite.

[3] British zone. [4] Five weeks ; other months four weeks.

[5] Figures for 1946 and 1947 include exports to France.